Alaska Department of Fish and Game
Division of Wildlife Conservation
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# Factors Limiting Moose at Low Density in Unit19D-East and Response of Moose to Wolf Control

Mark A. Keech
Toby A. Boudreau

Research Performance Report
1 July 2002–30 June 2003
Federal Aid in Wildlife Restoration
Grant W-33-1, Study 1.58

This is a progress report on continuing research. Information may be refined at a later date.

# FEDERAL AID
# ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

**PROJECT TITLE:** Factors limiting moose at low density in Unit 19D East; and response of moose to wolf control

**PRINCIPAL INVESTIGATOR:** Mark A Keech and Toby A Boudreau

**COOPERATORS:** Eric Post, Pennsylvania State University

**FEDERAL AID GRANT PROGRAM:** Wildlife Restoration

**GRANT AND SEGMENT NR.:** W-33-1

**PROJECT NR.:** 1.58

**WORK LOCATION:** The eastern portion of Unit 19D, the Kuskokwim River drainage upstream of the Selatna River.

**STATE:** Alaska

**PERIOD:** 1 July 2002–30 June 2003

## I PROGRESS ON PROJECT OBJECTIVES

OBJECTIVE 1A: Estimate moose numbers and population composition in Unit 19D East.

In October 2001 we conducted aerial surveys within the eastern portion of Unit 19D and completed a census of the moose population with the EMMA. No moose surveys were conducted in the study area during this reporting period due to inadequate snow conditions.

| Year | Area ($mi^2$) | Population estimate | Calves:100 Cows | Bulls:100 Cows | Yearling bulls:100 cows |
|---|---|---|---|---|---|
| 2001 | Unit 19D East (5200) | 1863[a] ± 485 | 29 ± 14 | 37 ± 18 | 9 ± 5 |
| 2001 | EMMA (520) | 440[a] ± 0 | 34 ± 0 | 18 ± 0 | 8 ± 0 |

[a] Estimates are not corrected for sightability (2001 estimate is 2247 for Unit 19D East and 531 for the EMMA when a 83% sightability correction factor is applied).

OBJECTIVE 1B: Determine primary causes of mortality of moose calves.

In May 2001 we captured and radiocollared 67 newborn moose calves in Unit 19D East, 51 of those were captured within or near the EMMA (1 calf died from captured related abandonment). We monitored those calves through their first year of life and investigated causes of mortality for those individuals. The overall survival rate for our collared sample of calves was 26% (17 of 66). We attributed 18 deaths (37%) to black bears, 17 deaths

(35%) to grizzly bears, 12 deaths (24%) to wolves, 1 (2%) death to drowning, and 1 death (2%) to nonpredation cause.

In May 2002 we captured and radiocollared 81 newborn moose calves, and visually monitored an additional 4 calves, within and near the EMMA (no capture mortalities). Survival for those calves through their first year of life was 26% (22 of 85 lived). We attributed 21 deaths (39%) to black bears, 12 deaths (22%) to grizzly bears, 28 deaths (33%) to wolves, and 2 deaths (6%) to nonpredation cause.

In May 2003 we captured and radiocollared 51 newborn moose calves in the EMMA (no capture mortalities). Survival for those calves through 19 June 2003 was 81% (41 of 51 lived). We attributed 3 deaths (30%) to black bears, 4 deaths (40%) to grizzly bears, 1 death (10%) to wolves, and 2 deaths (20%) to nonpredation causes.

OBJECTIVE 1C: Determine condition, movements, and mortality rates of yearling and adult moose.

In March 2001 we captured 25 adult and 15 yearling moose within the study area. In March 2002 we captured 15 adult and 15 yearling moose, and in March 2003 we captured 15 yearling moose. During processing moose had a blood sample taken, a tooth pulled (adults only), morphometric measurements obtained, rump fat determined via ultrasound (adults only in 2001 and 2002), weight taken (yearlings only), and radio collar affixed. These collared individuals were then monitored to determine reproductive indices, movements, and mortality rates. During these captures we had 2 capture related mortalities, both were yearling, 1 each in 2001 and 2002.

| Year | Observed adult rate of parturition (%) | Observed twinning rate (%) | 10-month calf weight in kg | Average adult rumpfat depth in cm (median) |
|---|---|---|---|---|
| 2001 | 70 | 30 | 179.1 | 0.71 (0.55) |
| 2002 | 92 | 59 | 191.8 | 1.51 (1.58) |
| 2003 | 95 | 25 | 179.5 | -- -- |

Through this reporting period, monthly locations of study animals indicated that moose within the EMMA are relatively nonmigratory, and no discernable large-scale movement pattern was evident. However, some moose that reside in the Pitka Flats (east of the EMMA) during calving season are apparently migratory, spending spring and summer in the Pitka Flats and then moving to the Farewell Burn/Alaska Range foothills in fall and winter.

Survival of collared yearlings from May 2001 to May 2002 was 83% (10 of 12). Survival of collared yearlings from May 2002 to May 2003 was 67% (18 of 27). None of the 37 collared yearlings died between May 2003 and the end of this reporting period (Jun 2003). The greatest component of yearling mortality during each year of this study was attributed to wolves with legal harvest and unknown cause accounting for additional deaths.

Survival of collared adult females from May 2001 to May 2002 was 88% (30 of 34). Survival of collared adult females from May 2002 to May 2003 was 89% (31 of 35).

Wolves were the greatest mortality factor during these 2 time periods, with illegal take and unknown nonpredation cause also accounting for some mortality. Two of 44 collared adult females died between May 2003 and the end of this reporting period (Jun 2003), 1 was killed by wolves and 1 died from birth complications.

OBJECTIVE 1D: Determine twinning rates and age at first reproduction of moose in Unit 19D East.

Twinning rates for collared adult females are listed under Objective 1c. In addition to collared individuals, we recorded sightings of uncollared cows with calves we saw within the study area. Twinning rates observed for these uncollared moose was 39% (18 of 46) in spring 2002 and 36% (14 of 39) in spring 2003.

Through this reporting period we have not observed any parturient radiocollared 2-year-old moose. In spring 2003, 5 of 9 radiocollared 3-year-old moose were observed with calves, giving an observed parturition rate of 56% for that age class. One of these 5 births was a set of twins; the other 4 were single calves.

OBJECTIVE 1E: Obtain data snow depth and density within the EMMA.

Data collected by the National Weather Service on snow depth within the EMMA and adjacent areas has been obtained. Results have not been summarized for this reporting period.

OBJECTIVE 2: Characterize winter moose browse in Unit 19D East.

Browse surveys were conducted in March 2003 via helicopter and snowmobile throughout the EMMA. A total of 39 locations and 236 plants were sampled within the area. Browse biomass removal in the EMMA was 20%, which falls between the range seen in areas of high moose browse use and low moose browse use. Birch, poplar, and willow species were all present in the survey area, although willow species tend to be the most preferred winter browse species in the EMMA, similar to most areas in Interior Alaska.

OBJECTIVE 3A: Estimate wolf numbers in Unit 19D East and identify wolf packs that hunt moose within the EMMA.

In the March 2001 survey, 103 wolves (no estimate of survey precision was possible) were estimated to be present in Unit 19D East, and 19 wolves were taken from the area prior to the survey (Boudreau, ADF&G unpublished memo). Results of this survey indicate that 33 wolves in 5 “core packs” were largely resident within the EMMA.

Since the March 2001 survey no additional wolf survey data has been obtained. Information collected incidentally during other fieldwork and from local trappers indicates that the EMMA is still inhabited by approximately the same number of wolves, although the yearly numbers within the EMMA fluctuate because of its small size.

OBJECTIVE 3B: Determine reproductive rates and condition of wolves in Unit 19D and compare rates with other wolf populations in Alaska.

We purchased 25 hunter- and trapper-killed wolf carcasses for necropsy between June 2001 and July 2002 and 29 wolf carcasses between June 2002 and July 2003. Necropsies were performed in spring 2002 and 2003. Data collected from carcasses and reproductive tracts indicate wolves from Unit 19D have normal parameters of condition.

OBJECTIVE 4: Document the distribution of black bear and grizzly bears numbers within and adjacent to the EMMA and characterize bear predation on moose calves.

In a collaborative project with Pennsylvania State University, we captured 21 black bears during May and June 2002 within the study area (1 died from captured related injuries). Preliminary analysis of data obtained by monitoring these bears indicates that most black bears use riparian areas within the central portion of the study area in spring and summer and then move to higher elevations in fall. Most of these bears also denned in back spruce forests near the areas where they spent time in the fall.

In spring 2003 a companion management program captured bears within the EMMA portion of Unit 19D and translocated them at least 150 miles away. During that project approximately 70 black bears (all older than 1-year old) and 8 grizzly bears (including 2 cubs-of-the-year) were captured and removed from the EMMA.

OBJECTIVE 5: Write annual progress reports and a final report, and publish results in peer-reviewed journals.

Federal Aid research performance report covering 1 July 2001–30 June 2002 was written and submitted to Federal Aid during this reporting period, and has been posted to the ADF&G website. Preliminary results "Causes and timing of moose calf mortality on the Kuskokwim River, Alaska" were presented at the Fifth International Moose Symposia, in Hafjell, Norway, in August 2002. Preliminary results "McGrath moose: a research and management update" were presented at the University of Alaska Fairbanks in April 2003. No other results were reported or published during this reporting period.

## II SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1A: Moose population estimation and surveys of moose in treatment and comparison areas.

This job was not accomplished during the reporting period. Lack of adequate snow cover during October and November 2002 prevented moose surveys from being conducted within the Unit 19D study area.

JOB 1B: Calf mortality study.

This job was accomplished during the reporting period. Federal Aid funds were used to pay for 54 moose calf collars and flight time of a Robinson R-44 helicopter used during moose calf capture operations in May and June 2003 (approximately 30 hr). Funds were also used to pay for lodging, for aviation fuel for State of Alaska fixed-wing aircraft, and boats used during the capture project, and the subsequent monitoring of collared animals. Funds were also spent on helicopter time (both R-22 and R-44) needed to retrieve mortalities

(approximately 5 flights) from the field and salary for Alaska Department of Fish and Game employees.

JOB 1C: Radiocollaring and tracking 10-month-old and tracking adult female moose.

This job was accomplished during the reporting period. Federal Aid funds were used to pay for 15 yearling moose collars, immobilization drugs, and flight time of a R-44 helicopter used during moose capture operations in March 2003 (approximately 15 hr). Funds were also used to pay for lodging, for aviation fuel for State of Alaska fixed-wing aircraft used during the capture project, and the subsequent monitoring of collared animals (approximately 15 flights). Funds were also spent on helicopter time (both R-22 and R-44) needed to retrieve mortalities (2 flights) from the field and salary for Alaska Department of Fish and Game employees.

JOB 1D: Calving/twinning surveys in treatment and comparison areas.

This job was accomplished during the reporting period. Federal Aid funds were used to pay for fuel for State of Alaska fixed-wing aircraft used during the monitoring of collared study animals and the observation of uncollared moose in May and June 2003 (approximately 30 flights). Funds were also used to pay for lodging of survey crews and salary for Alaska Department of Fish and Game employees.

JOB 1E: Snow data collection.

This job was accomplished during the reporting period. Federal Aid funds were used for salary for Alaska Department of Fish and Game employees to collect and summarize snow data available from the National Weather Service.

JOB 2: Browse surveys.

This job was accomplished during the reporting period. Federal Aid funds were used to pay for approximately 7 hours flight time of a R-44 helicopter and for snowmobile fuel for State of Alaska snowmobiles, both of which were used to visit browse plots. Funds were also used to pay for lodging and commercial flights to McGrath for the survey crew.

JOB 3A: Wolf population estimation.

This job was not accomplished during the reporting period. No Federal Aid funds were used for wolf population estimation. Funds that were allocated for this job were used to help pay for the 2003 calf capture project.

JOB 3B: Wolf carcass collection and necropsy.

This job was accomplished during the reporting period. Federal Aid funds were used to pay trappers and hunters for 29 carcasses they brought in during winter 2002–2003, and salary for Alaska Department of Fish and Game employees.

JOB 4: DNA analysis of hair samples.

Currently hair samples are at a lab for analysis and were not completed by the end of this period. Funds from this reporting period were redirected to the calf capture project.

JOB 5: Literature review, data analysis, report writing, and publication of results.

This job was accomplished during the reporting period. Federal Aid funds were used to provide salary for people working on literature review, data analysis, and report writing.

## III ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

None.

## IV PUBLICATIONS

KEECH MA, TA BOUDREAU, AND P VALKENBURG. 2002 (posted to the ADF&G website). Factors limiting moose at low density in Unit 19D East, and response of moose to wolf control and increased bear harvest. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration Research Performance Report. Grant W-27-5. Project 1.58. Juneau, Alaska.

### PRESENTATIONS

KEECH MA, TA BOUDREAU, AND P VALKENBURG. 2002. Causes and timing of moose calf mortality on the Kuskokwim River, Alaska. Fifth international moose symposia, Hafjell, Norway, oral presentation, August 2002.

KEECH MA. 2003. McGrath moose: a research and management update. University of Alaska Fairbanks, oral presentation, April 2003. Fairbanks, Alaska.

## V RECOMMENDATIONS FOR THIS PROJECT

This project was initially set up as part of an adaptive management plan that was based upon continually changing methods and goals as determined necessary by the public, Alaska Department of Fish and Game, and other stakeholders. We recommend this project continue to be flexible in the study design and protocol as more information is gathered and as circumstances change.

## VI APPENDIX

None.

## VII PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $161,181 STATE SHARE $53,728 = TOTAL $214,909

**VIII PREPARED BY:**

Mark A. Keech
Wildlife Biologist III

Toby A. Boudreau
Wildlife Biologist III

**SUBMITTED BY:**

Jay M. Ver Hoef
Acting Research Coordinator

Laura A. McCarthy
Publications Technician II

**APPROVED BY:**

_____
Thomas W. Paul, Federal Aid Coordinator
Division of Wildlife Conservation

_____
Matthew H. Robus, Director
Division of Wildlife Conservation

**APPROVAL DATE:** _____